ADVANCED TOPICS - CALTRANS RUSLE2

Frequently Asked Questions

The following questions are from the August 18, 2011 Advanced Topics Webinar:

1. Q - Do you know of a database that you can query for the R factor (10 year, 24 hour rain intensity) using Lat/Long?

   A – Caltrans does not have a database where you can input Lat/Long to get the R factor, but there is mapping for this. The easiest to find place for this is the District 8 website, which has several layers, including one that has the average annual rainfall mapping. This mapping will also show up in a few other places including CT Earth, which is being developed and hopefully will be the tool we use statewide in the near future. RUSLE2 calculates the R factor based on the average annual rainfall for a particular location. Using the climate tab in RUSLE2, select from various climate files. The file naming convention uses Country (USA), California, and then by District and County. On the right-hand side of the filename is an R, then a number representing the average annual rainfall for that location. (Robert Schott)

2. Q – Please explain the relationship, if any, between the RUSLE2 r-value and the erosivity waiver R-factor

   A - To get the waiver you have to have an R factor of less than 5. This ties into the length of time your project is exposed; winter months would have more exposure than say summer months. You can drill down into RUSLE2 into the Climate tab by double-clicking on the yellow folder and actually get an R value out of the RUSLE2 program. Unfortunately it varies quite a bit from what you see in the EPA calculator as this has to do with the amount of time the project is under construction. (Robert Schott)

3. Q – In future trainings it would be nice to go into greater detail of how to determine the R factor. If a first time user gets as far as the State, County they will be faced with various R factors. It would be nice if you address how to determine a site's R.

   A – Answered in Questions 1 and 2. (Robert Schott)

   For RUSLE2 to get "R", use the average annual rainfall mapping.

   For CGP Risk Level Determination, get "R" by using the EPA's R-Factor calculator website.

4. Q – I had a CD with RUSLE2 software but was unable to download it. Can we download the program from the website?

   A – There has been some trouble with the CDs being unreadable on certain machines. The website will be updated with an August version of RUSLE2 and an August version of the Erosion Prediction Procedure (EPP) document, along with several other items including this webinar. (Robert Schott)

Please check the website for updates at:

http://www.dot.ca.gov/hq/oppd/stormwtr/rusle2.htm

5. Q – What documentation would be appropriate to justify a change in K value? Are there any theoretical ways to predict the final % of OM?

   A – This question lead to several related answers.

   1) Design question on adding compost: The question I think you are really asking is "when is compost blanket versus compost incorporate appropriate?" Because when you are choosing to modify the K Factor, you are choosing to change the soil structure and incorporate the compost. So you are asking "what documentation is necessary in order to choose to incorporate versus to choose to put a blanket on?" And there is no documentation. It's a professional judgment based on the permit requirements that now state that our maximum allowable erosion rate, pre-construction, has to be met or be less than post-construction. So it's a matter of evaluating this different EC option, one of which may be incorporating compost and modifying that K factor. In terms of theoretical ways to predict the final percentage of organic matter, we can't really ever answer that question. However, Landscape Architecture has done a lot of research in the last 5 years on the value of compost from a soil health perspective. And now we are starting to apply that research and get other values such as infiltration value. From the angle that getting credit for infiltrating our stormwater volumes is where the permit requirements are heading. (Lisa Worthington)
   2) Organic matter in soil- prediction vs. measurement: From my perspective, there is no way to take fundamental principles and predict organic matter percentage. There are just too many variables. You can't model it. It's better, if you really need to know, to go out and measure it. It's a $15 analysis and modeling it would be thousands of dollars and would probably be unreliable. (Jeff Bold)
   3) Does adding compost change the soil's K value: Since the K value is determined by particle size (sand, silt, clay), adding organic matter should not change a soil's K value. Adding compost does increase organic matter which does alter soil paramenters such as compaction, infiltration, and water holding capacity. Documentation for changing K would be the same as for a complete change of soil type. (Robert Schott)

6. Q – So correct me if I am wrong, but it seems to me that vegetation/planting seems to be the best alternative?

   A – This question lead to several related answers.

   1) Yes, vegetation is the best alternative, but of course, as you know, vegetation has to establish. So what comes before the seeding is what matters. What's your soil structure? What's your soil profile? You know that, as Landscape Architects, it's a complicated recipe, and the success of vegetation is dependent upon a lot of factors that are in your control, such as the type of seed mix that you choose, and many factors that are not in your control. The qualifier of RUSLE2 is that it's an estimating modeling program. What gets put in the contract documents is in part dependent

upon the value of that data or the accuracy of that data that you collect and you start out with, and you digest, and you discuss as a project development team. Vegetation and planting yes, but there are areas that do not, or would never require vegetation. (Lisa Worthington)

2) I can envision a situation where you might be in a very arid area, one of the deserts, and you look around at the context and you see the existing soil is covered with what looks like rock mulch. It's very coarse sand, pebbles and rock. I'd look into RUSLE2 and see if I can pick a BMP that matches that. And we do have that in the toolbox. Then maybe as the final cover, I want to put down something similar. Even these extreme situations can be modeled using RUSLE2 if that is your desire. (Robert Schott)
3) Just to add to that, I'm familiar with desert pavement, which sounds like what Bob is describing; sage brush and desert pavement in Tombstone, Arizona. I can't say that RUSLE2 has that built in, but we do have some pretty extreme soil types including pretty much a pure gravel that we can use to simulate that. (Jeff Bold)

7. Q – If slope rounding changes parts of the slope to be steeper than 2:1, will this require District Maintenance approval and Geotech involvement and review?

   A – I would have to say that all slope constructing does require maintenance review and Geotech involvement. You would be unwise to take them out of the picture. Now when you are working on flatter slopes, you man not need to get them involved, but when you have a 2:1 anyway, they should be involved in the design and the selection of a proper alternative. (Robert Schott)

8. Q – Regarding Compost Incorporate. How does the OM at 2% reflect what you're actually incorporating? Not sure the measurements are equivalent. Incorporate 2 inch of compost and OM 2%. The units are not equal (inches and %)?

   A – That is absolutely correct. By coincidence, we had a compost blanket that was two inches and in this exercise we used a soil that had a 2% organic matter. That's purely just luck. There is no correlation to incorporating six inches of compost and coming out with organic matter percent of some known increase. It's going to vary by the climate, how hot it is, and it's going to vary based on the moisture content, how wet it is. Some people will say that soil, especially the surface part, is a living section of the earth, so it's going to have many, many factors going into that. (Jeff Bold)

9. Q – On a five mile project how many sections would a designer look at and run the RUSLE2 program on?

   A – This question lead to several related answers.

   1) This question really relies on a very thorough site analysis that precedes running RUSLE2. Because you first need to determine what the variation in soil type, aspect, etc., percent cover of vegetation etc, are for your project. Landscape Architecture is partnering with Stormwater to help the process of evaluation by compartmentalizing this information. Perhaps into a worksheet of some kind, a site analysis worksheet, where you can go back to the office with your site photos and all of your data. Pre-

determine some reference sites that represent the range, the extreme end, the average and perhaps the best in terms of aspect vegetation cover etc. Therefore in a 5 mile long project you can have one, or you could have five. I would say five would be your upper limit. Again, it requires best professional judgment. (Lisa Worthington).

2) The number of RUSLE2 runs will rely on project conditions and best professional judgment. If the all the slopes within a project are nearly identical as to slope length, steepness, climate, and soil type, a single RUSLE2 run may sufficiently represent the project's slopes. If the slopes exhibit a variety of length, steepness, soil type, and other differences, several RUSLE2 runs may be needed to competently address the slopes. (Robert Schott)